Paul Hommert praises Labs' diversity to National Academy of Sciences

By Jim Danneskiold

Sandia's efforts to move into mission areas outside traditional nuclear weapons engineering over the past decade have made the Laboratories stronger and more capable of solving a wider variety of national security issues, Director and Laboratories President Paul Hommert told a National Academy of Sciences (NAS) panel that visited Albuquerque last month.

"There is no question that the nuclear weapons program has benefitted from the diversification of our work," Hommert told the NAS committee, which is visiting all three NNSA labs this spring to study how well they are maintaining their research foundations.

The panel, which is expected to issue a report later this year, examined Sandia's work and mission, its relationship with NNSA and DOE, and recent improvements in how the federal agencies, and Sandia, evaluate the Labs' performance. The hearings are the fact-finding portion of the NAS "Review of the Quality of the Science and Engineering Research at the Department of Energy's National Security Laboratories."

Members of the panel, led by former Lawrence Berkeley National Laboratory Director Charles Shank, quizzed Hommert and Sandia Chief Technology Officer Steve Rottler about the relationship between the Sandia management and operations contract and the quality of research. They also asked how Sandia measures the quality of its research and engineering and how it manages work for federal agencies other than the DOE, academic institutions and private companies.

Hommert explained that NNSA closely scrutinizes Sandia's Work For Others projects and other research and development agreements that reach outside DOE and into the private sector. NNSA has the right to reject those agreements but approves nearly all of them. The agency has a very good understanding of the potential risks inherent in doing work outside DOE, he added, but NNSA supports Sandia's efforts to broaden its mission because those projects strengthen its science and engineering base.

Director and Laboratories President Paul Hommert described Sandia's unique research and development capabilities and technical foundations during his presentation to a National Academy of Sciences panel. (Photo by Randy Montoya)

Sandia's research foundation, in turn, strengthens its status as a Federally Funded Research and Development Center, or FFRDC, Hommert said. He pointed to Sandia's strategic objective of leading the DOE complex as a 21st Century Government-Owned, Contractor-Operated national laboratory, which he said means the Labs should be better able to "meet special, long-term research or development needs."

When asked about DOE oversight, Hommert told the panel that Sandia was subject to 72 major external audits last year. However, Hommert said Sandia's overall relationship with the DOE/NNSA Sandia Site Office has been improving. He said one element in that relationship is Sandia's adoption of national standards in certain areas. Following those standards, he said, will help reduce the sometimes burdensome requirements that have grown out of efforts to comply strictly with DOE orders.

Hommert reiterated that he and the rest of Sandia's management have been strong advocates for greater recognition in Washington, D.C. of the breadth of Sandia's current mission and for efforts to increase that breadth. He told the panel they seek "a broad federal entity sanction" for their efforts.

Shank, the panel's chairman, voiced strong support for Hommert's strategy of capitalizing on wider-ranging research and development work to build Sandia's technical foundations, and for efforts to shift from a "rules-based" compliance environment to one based on broad science and engineering principles.

Inside

Sandia LabNews

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Sandia National Laboratories

Sandia partners with TUV Rheinland PTL, LLC to advance nation's photovoltaic industry

By Stephanie Hobby

Technology developed and perfected at Sandia National Laboratories is being used to accelerate the growth of the nation's photovoltaic solar power industry through a partnership with TUV Rheinland PTL, LLC, a private testing and certification company in Arizona.

"The unique, multiplatform test capabilities developed at Sandia Labs are providing a tremendous value to our customers," Govindasamy Tamizhmani of TUV-PTL says.

As a leader in PV research, the Photovoltaics and Grid Integration Department at Sandia Labs has been the source private companies have consistently turned to for testing and analysis needs. But as the nation's PV industry continues its exponential growth, keeping up with those demands is no longer feasible.

"Transferring our technology to a commercial test house allows for a much faster response time for getting PV into the field," Sandia researcher Jennifer Granata (6112) says. "This partnership enables us to continue to support requests while maintaining our primary focus on research and new technologies."

In 2009, Sandia opened a competitive bid for a third party to certify systems using Sandia technology, which was awarded to TUV-PTL in May 2009. Fourteen months later, Sandia verified the test and analysis methods of TUV-PTL through two rounds of exacting tests and the contract was completed.

Traditional tests only characterize modules at one temperature, one irradiance, and one spectrum, but Sandia's technology allows users to test PV modules with a high accuracy, dual-axis tracker and gather data on multiple weather conditions, temperatures, irradiances, air mass values, and angles of incidence. The data are then used to build models to predict how a module would behave in any location.

"As the industry and test standards slowly and steadily move away from single-condition to multicondition testing, the future for this new service looks great and allows us to provide a unique capability to our customers," Tamizhmani says.

Since being awarded the contract, TUV-PTL has successfully used Sandia's test methods for several clients to understand various real operating conditions in the field.

The technology transfer was conducted under the Department of Energy Solar Energy Technologies Program PV Test Technology Transfer effort.

The test yard used by TUV-PTL in Arizona. (Photo courtesy of TUV-PTL)

That's that

Note: *Lab News writer Iris Aboytes fills in with a That's that column this week for Editor Bill Murphy.*

***

The peaceful ouster of Hosni Mubarak, president of Egypt since 1981, after 18 days of demonstrations really struck me.

The Egyptian revolution created a campaign of civil resistance. It had a series of demonstrations, marches, acts of civil disobedience, and labor strikes. Millions of protesters from different backgrounds caused the resignation of Mubarak's regime.

The people finally had enough of his internal venom. He became his own poison and destruction. His power had dissolved. The people took a stand: not one, not two, but millions of them.

Nations and peoples are continually tested. With our last great test on 9/11, America just keeps getting stronger. Its citizens, a symbol of freedom and justice, fly the flag with pride and devotion. Is this what Egyptians are working to achieve? One can only hope.

Abraham Lincoln said, "Nearly all men can stand adversity, but if you want to test a man's character, give him power."

***

Driving to work early one morning, I stopped to get some gas station coffee. You know the kind – it rots your teeth and enables you to have out-of-body experiences. I poured my coffee and was on my way to the register when I noticed a young man cleaning up some coffee that had been spilled. When I got to the register, I told the young lady that I would like to pay for the young man's coffee. I told her that he had wiped up some spilled coffee and might have saved me a fall.

"Oh, that's my husband," the young lady told me. "I come to work very early, and he worries about my safety, so he comes with me. He helps me out until it is time for him to go to his job."

I have visited with them on subsequent mornings. They are always very friendly. When we have talked about him helping her, he says, "This is what we do. We are here for each other."

They don't know this, but when I leave that gas station I feel I have received a shot of optimism, and it has nothing to do with the coffee.

***

As Sandia's Employee Caring Program publicity chairperson, I am always looking for stories that highlights the best of the best. I came across a story about a bowling event to benefit kids. A large company had eight teams participating. One of the teams captured my enthusiasm and spirit.

It was not their bowling, but the zest and vigor with which they did it. After coming up with a team name, the Mixed Nuts, each took a nutty name. Wayne became Wing Nut, Melissa became Nut Case, Randy was Pea Nut, Adris was Lug Nut, and Carrie was the Nut Cracker. T-shirts were designed; beanies with propellers and nerd glasses completed their ensemble. The women in the team also carried pom-poms.

Were they the best bowlers in the company? Probably not, but what they possessed was much more than that. First and foremost, their purpose was to raise money, and that they did. More importantly, they created an adventure. Instead of just bowling, they entertained, not just each other, but their co-workers. They brought attention to their cause and they had a good time. They were winners on all sides.

Reading it made me want to be a part of it. I could be Coco Nut or Y Nut?

***

I am always amazed by the simplicity of a child. Sometimes it is the most unlikely things that bring them joy. Recently my little granddaughters Mackie, 6, and Maddie, 10, were having a particularly great day (no fighting). After their shower, they decided to go downstairs and watch a movie. Mackie says to Maddie, "Come on Maddie. Let's go downstairs, get something to eat, and – pop our toes!" There was instant giggling.

I don't know about you, but the thought of popping my toes has never occurred to me as something to enjoy. But hey, I'm game. Wanna try it? Let's go downstairs, get something to eat, and – pop our toes!

– Iris Aboytes, (505) 844-2282,MS 0165, ioaboyt@sandia.gov

Diversity Gala yields bounty

Sponsored by Sandia's Diversity and Inclusion Office, the second annual Diversity Gala was a huge success. The gala opened Diversity and Inclusion Conference Week — Lasting Inclusion for Everyone. Paul Hommert welcomed employees to the gala that included a culinary festival and many workshops of interest to Sandians.

DIVERSITY GALA coordinator Pam Losinski (0851), Senior Manager Esther Hernandez (0040), and Marie Brown (0040) with donations of towels, toiletries, and nonperishable food collected for the Roadrunner Food Bank.

The Roadrunner Food Bank and Metropolitan Homelessness Project were the biggest winners at the Gala. Gala participants were encouraged to donate new and used towels and toiletries for the shelter and nonperishable food items for the food bank. Barrels were placed in the lobby of IPOC, Steve Schiff Auditorium, and Bldg. 750.

Donations coordinator Pam Losinski (0851) says the response was overwhelming. Fifteen Xerox paper boxes were filled with toiletries, more than 1,000 towels were received, and six barrels were filled with food.

"It is inspiring to see our leadership and so many members of the workforce getting involved in our philanthropy and inclusion efforts," says Esther Hernandez, Corporate Diversity and Inclusion Senior Manger (0040). "It is this type of active engagement that will enable us to succeed in our continued journey to build and sustain a diverse and inclusive environment."

If you meant to attend any of the workshops but were unable to do so, you can view them on your desktop. They are available at sharepoint.sandia.gov/sites?DIO/x-conf-gala.aspx. The videos available include: *Hearing Loss Awareness, Men and Women as Colleagues*, *The Power of Inclusive Leadership*, *What I meant to say*, and *Understanding Tribal Interactions*.

— Iris Aboytes

Sandia LabNews

Sandia National Laboratories

http://www.sandia.gov/LabNews

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DOE Launches 'America's Next Top Energy Innovator'

The Sandia-developed water contaminant removal system and a method for detecting the impacts of glare on solar installations are among the technologies that will be available as part of the newly announced "America's Next Top Energy Innovator" DOE program.

The program will give startups the opportunity to license groundbreaking technologies developed by the 17 national laboratories at $1,000 for the purpose of building successful businesses. As part of this effort, DOE is reducing both the cost and paperwork requirements for startups to obtain an option agreement to license some of the 15,000 patents and patent applications held by the various labs.

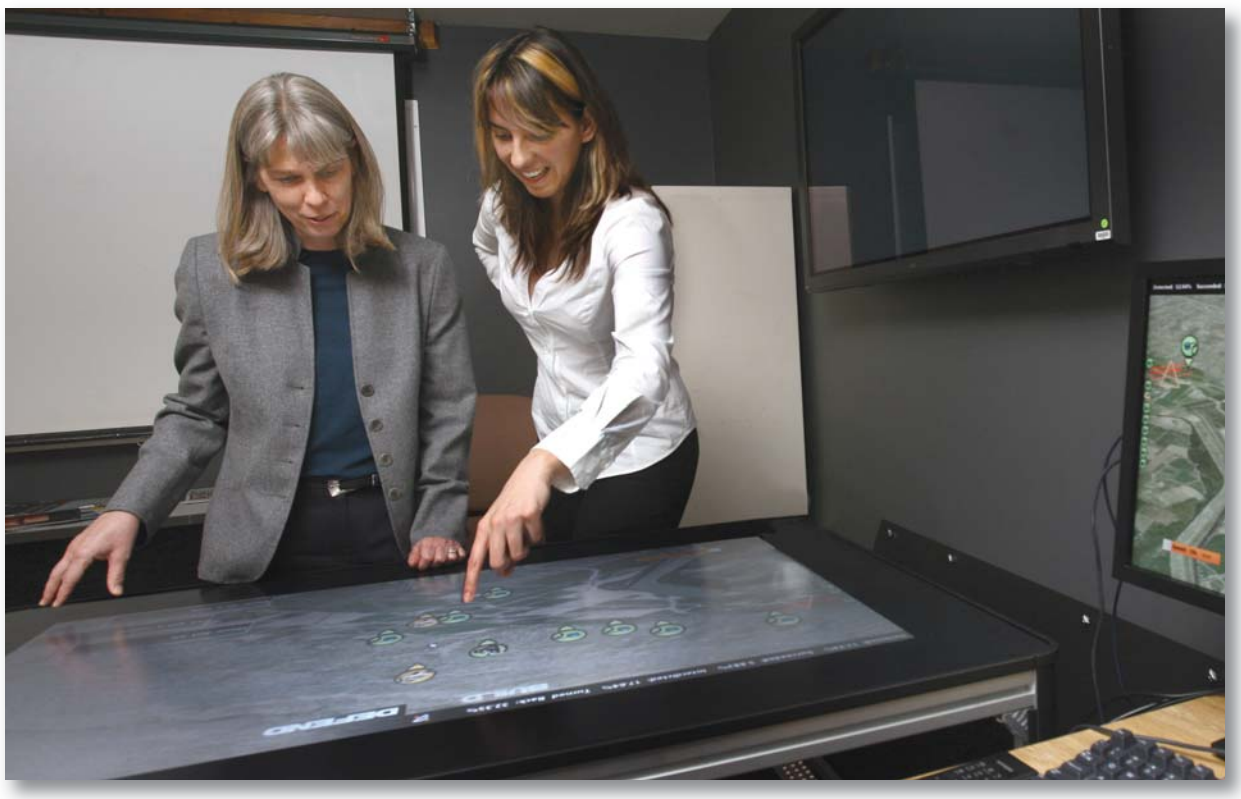
Currently, only about 10 percent of federal patents have been licensed to be commercialized. This initiative aims to double the number of startup companies coming out of DOE laboratories.

On Monday, May 2, DOE will kick off the challenge by posting a streamlined template option agreement online for entrepreneurs to submit to laboratories. Entrepreneurs must identify the technology of interest and submit a business plan to be considered for the program. Participants will have until Thursday, Dec. 15 to make their submissions to the laboratories.

Visit http://techportal.eere.energy.gov/ for more information about available technologies.

Sandia researchers merge serious gaming, simulation tools to create high-level models for border security

By Mike Janes



Donna Djordjevich (8116) describes the high-level model of border security to Jill Hruby, VP of the IHNS SMU and Div. 6000. The software provides a virtual environment where users can run various scenarios to see the outcome of their decisions.
(Photo by Dino Vournas)

The responsibility of securing the US homeland from terrorists and other threats while facilitating legitimate trade and travel falls on the shoulders of the Department of Homeland Security's Customs and Border Protection (CBP). It's not an easy task.

Sandia researchers at both the California and New Mexico sites, however, are doing their part to help the government answer the difficult questions that face CBP officials every day. With funding from CBP, Sandia is using a serious gaming platform known as Ground Truth, a force-on-force battle simulation tool called DANTE, and the work of several collaborating organizations to develop the Borders High Level Model (HLM), a high-fidelity simulation and analysis program that aids policy and decision-makers tasked with making key procurements and funding choices.

"There's a lot of debate going on in the government concerning the technology and infrastructure investments that need to be made along the border," explains Jason Reinhardt (8112), who serves as the Borders HLM project manager and deputy program manager for borders security within the Labs' International, Homeland and Nuclear Security (IHNS) Strategic Management Unit. "How much fence do we need? What kind of fence? What is the right mix of border personnel and technology? How can sensors, vehicles, and other technical equipment most effectively be used? With Borders HLM, CBP officials can simulate their defensive architectures, accurately measure their performance, and start to answer these difficult questions."

Ground Truth (*Lab News*, 8/17/07), initially funded through an LDRD in 2007, is a gaming platform originally designed to prepare decision makers and first responders for weapons of mass destruction/weapons of mass effect (WMD/WME) attacks in metropolitan areas. Developed by computer scientist Donna Djordjevich (8116), principal investigator on the Borders HLM project, the software provides a virtual environment where users can play through various scenarios to see the effects of their decisions under the constraints of time and resources.

For the Borders HLM project, the Ground Truth software has been integrated into a bottom-projected touch surface table. On this game surface, users can see "people" moving across the border terrain, observe CBP "personnel" respond to incidents, and essentially control those movements and "apprehend" suspects. Users can also view a leader board of sorts that shows how many suspects have been apprehended, the dollar amount spent implementing the chosen architecture, and other metrics that matter to CBP decision makers.

DANTE, also part of the Borders HLM platform, is a force-on-force battle simulation tool built on the well-known Umbra simulation framework (http://umbra.sandia.gov/) that Sandia researchers developed and introduced in 2001. Umbra is a flexible, tactical, hybrid simulation engine and framework that can integrate physical, cyber, and behavioral elements at variable fidelity in a 3-D environment.

The work also builds upon a Borders Grand Challenge project from the mid-2000s (focused on the impact of new detection technology at ports of entry) and capitalizes on a range of existing Sandia capabilities, including the Weapons of Mass Destruction Decision Analysis Center (WMD-DAC), the National Infrastructure Simulation and Analysis Center (NISAC, a joint Sandia and Los Alamos National Laboratory program), and even the Labs' expertise in robotics.

Jason compares Borders HLM to the popular Command & Conquer video game.

"Players can watch people run across the border, and they're seeing terrain, they're seeing Border Patrol agents respond and drive around on horses or helicopters or other vehicles, and they're actually 'driving' in a Command & Conquer-style response," he says. "You might choose to go get this guy, respond to an alarm, adjudicate this apprehension, and so on. Then, at the end, you can evaluate how everything worked."

There were a number of technical challenges in integrating a mature modeling technology like DANTE with a newer gaming technology like Ground Truth, say Jason and Donna.

"We needed to create real-time control for the user, and our current capabilities weren't built to do that," Jason says.

"There's also the fact that we're modeling 64 square miles of border, and we need to do so at a pretty high fidelity," adds Donna, who points out that Ground Truth's terrain was originally developed at a fixed, small scale.

To help overcome some of the barriers, Sandia has looked to some important collaborators.

The University of Utah offers a technology, Visualization Streams for Ultimate Scalability (ViSUS), which allows researchers to progressively stream in terrain and imagery data and minimize data processing requirements, an important consideration given that HLM requires many gigabytes of data. For its part, Happynin' Games, an iPhone/mobile game development company, developed the 3-D artwork and the characters found in the simulations. Sandia, acting as the systems integrator, then put all the pieces together, presented the Borders HLM product to CBP, and demonstrated how it would allow them to go through all the steps of the "engagement analysis cycle."

"We learned that the Border Patrol agents and CBP decision-makers need a tool that offers a common view of the problems they face," Jason says. "With our high-level model, they can play through various scenarios and see how people, technology, and other elements all interact. Then, later, they can go back and do a baseline analysis and dig into the details of why certain architectures and solutions aren't working as well as they should."

Even better than failure recognition, Jason points out, is Borders HLM's ability to demonstrate viable solutions that CBP can implement into its security plans. "They can then play the game again with a recommended solution, and the end users – the people who are actually charged with making it happen on the ground – can critique and tweak it to their liking."

With additional funding and the right kind of collaborations, Donna says, more robust features could be added to make Borders HLM even more valuable to CBP and other potential customers. The current version, for instance, only deals with individual border crossers, so it doesn't capture crowd behaviors. Other sensor types, such as radiation detectors or even airborne equipment, could also be added.

Jason says the future of the Borders HLM tool will likely depend on the direction in which CPB chooses to go with its border operations.

"CBP is undergoing a shift in the way it evaluates border security," he says. "It's really a difficult problem they're facing, so they've been trying to figure out a systems engineering approach. Our high-level models tool will likely change the way CBP conducts it business, and it will probably have a real long-term impact on how large expenditures are justified or reputed on and around the nation's borders."

A high-level view of Borders HLM operating, showing an example architecture along the US-Mexico border.

Sandia CaliforniaNews

From fork to farm

Café's food waste composting program keeps leftovers out of the landfill

By Stephanie Holinka

At Sandia's Thunderbird Café, a leftover lunch burrito can find its way into a fertile soil for a backyard garden. When someone leaves that leftover sandwich on a lunch plate, Thunderbird Café employees send it out for composting.

The composting program began in March of last year as a pilot to divert food preparation waste and leftovers from the regular waste stream that is sent to Rio Rancho's landfill.

With the exception of only a few initial bumps, the program has been a success. "We had problems at first with getting non-compostables separated, but it's gotten better over time," says Café supervisor Steven Lassiter (3333).

The composting program won Sandia's internal 2011 Environmental Management Systems (EMS) Excellence Award for the Risk Mitigation/Environmental Protection category.

"During the six-month pilot last year the Café diverted more than 15,000 pounds of wet food waste from going into the landfill," says Sandia/New Mexico's recycling coordinator Sam McCord (4144).

"Thanks to the cafeteria staff's successful adoption of the composting process and the great results," Sam says, "the program has been fully adopted this year." Sam expects that Sandia will divert more than one-third of the Thunderbird's routine waste into the composting program. The costs of composting are now being paid for with revenue from recycling other waste materials at Sandia — such as cardboard and paper — and it's expected that the cost of refuse disposal at the cafeteria will decrease after the program is fully established.

Sam also expects the program to expand into other food-serving facilities at the Labs. Currently, there is work to expand recycling efforts to the Tech Area 4 cafeteria, Bldg. 960, including placing bins in the area for diners to sort their biodegradable materials for composting. Because the Tech Area 4 café requires less variety in its food packaging, that location will be able to begin using special compostable plates and utensils, Sam says.

FROM FORK TO FARM — Misch Lehrer, Soilutions manager, examines the soil that is the final product of approximately a year and a half of composting. Leftovers from Sandia's café now become topsoil as part of a composting program. (Photo by Darrick Hurst)

FROM GARBAGE TO GREEN — Over the next year and a half, microbes will convert this garbage to usable topsoil and mulch. (Photo by Darrick Hurst)

Harnessing leftovers

In the cafeteria's dishwashing and prep areas, café staff dispose of any plastic items in the regular trash. They then put food scraps and leftovers from dishes into bins that are about the size of an average large kitchen wastebasket and are lined with bags made from a compostable plant resin.

As the bags are filled up, they are deposited in larger green bins located in the parking lot at the rear of the café. These bins are only slightly smaller than the trash bins used by the City of Albuquerque for residential trash pickup, in order to accommodate food waste that tends to be heavier. Even the bins themselves are recycled and still bear "Madison, Wisconsin" logos on them — a leftover from where they began their life as residential trash bins.

Representatives from Soilutions pick up the bins twice a week (more if needed). The collected food goes to the Soilutions facility on Albuquerque's far South side where it begins its metamorphosis.

Transforming food to organic compost

When the bins arrive at Soilutions, all of the materials are spread out on absorbent material to remove standing moisture. The materials are then combined in a large pile where workers mix them with drier, ground-up materials such as wood chips and straw.

"Soilutions picks up anything that has been alive," says Misch Lehrer, Soilutions manager. They accept food waste from area businesses and organizations, such as Whole Foods Market Inc., the Hyatt Regency Tamaya Resort and Spa, the University of New Mexico, Central New Mexico Community College, and many others, Lehrer says. Soilutions also accepts waste from area farms, such as manure and straw, as well as dead and wilted flowers from local flower shops. Additionally, Soilutions works with events planners to harvest scraps from one-time events like the annual Pork 'N Brew event in Rio Rancho.

"We're basically microbe farmers," Lehrer says. "We provide ideal microbe conditions. We give microbes food, water and air and they do the work." Lehrer says the compost's microbes double in number about every half hour. As they eat, they create carbon dioxide and heat.

Due to the scale of its operation, Soilutions composts items that home composters are typically told not to add to their piles. "Home composters should avoid [composting] meat and dairy items," Lehrer says. "There's nothing wrong with composting these things, but they do tend to attract scavengers and they take a long time to compost in smaller piles that don't get as hot as the larger piles can get."

When the initial compost pile reaches a certain point, Soilutions stops adding new materials to the pile, so it can begin to fully decompose. "Within a week, the piles heat up to around 160 degrees in their center," Lehrer says. "The materials get broken down into smaller and smaller particles as microbes eat the food materials and form humic acids, which plants are able to use."

As the pile ages and decomposes, the materials become more dense and Soilutions staff aerate the compost by turning it every few months, both adding moisture to the pile's exterior materials and assuring that the compost's materials break down evenly.

Soilutions staff must regularly screen the piles' contents for hidden plastics that may have found their way into the compost piles. "Plastics are forever," Lehrer says. "Plastics do not decompose, so they must be removed manually and shipped off to a landfill; they are a waste product for us."

When the pile is nearly ready, the Soilutions staff screen-sort the resulting compost for size. The largest pieces will go back into compost piles at earlier stages in the process, while the smaller pieces are sorted into compost, topsoil, and various types of mulch that are sold to landscape companies and home gardeners.

According to Lehrer, the composting process takes quite a bit of time. "It takes a year to a year-and-a-half for food waste to break down completely into organic compost," he says. "Food waste from the beginning of the pilot program is almost ready to help things grow this spring and summer."

While Lehrer may be the expert when it comes to composting, he says his gardening expertise is limited to making dirt. "My wife is in charge of our home garden — my specialty is dead plants."

To learn more about Sandia's food waste recycling program or to investigate home composting, check out the P2/Soilutions/T-bird booth at this year's Earth Day Celebration, Thursday, April 21, at the Steve Schiff Auditorium, or search "Earth Day" on the TechWeb.

How you can participate

- **Use dishes and metal utensils when dining at Thunder bird Café** - Plastic utensils are not reused at the cafeteria and become trash that must be thrown away.
- **Leave leftover food on your plates** - Cafeteria staff will send your leftovers for composting after you place your tray on the conveyor.
- **Recycle aluminum cans and plastic bottles** - Recycle bins are available both next to the café's indoor tray return and on the outdoor patio.
- **Dispose of nonrecyclable plastics in trash containers** - Soilutions says that their biggest source of contamination is plastic waste that must be picked out by hand and disposed of in a landfill.

New Mexico Business Weekly names Sandia New Mexico's Healthiest big company employer

Story by Iris Aboytes

New Mexico Business Weekly (NMBW) named Sandia the healthiest big company employer in New Mexico at a ceremony at the Embassy Suites on Thursday, March 24. The award honors employers that support employee health and wellness.

The Bell Group was named winner in the medium group category, and Manuel Lujan Agencies was named small company winner. A total of 15 organizations were honored at the event.

Nominations were received from organizations with operations in New Mexico. Each participant completed a 75-question online survey designed by *NMBW*'s survey partner, Healthiest Employers. The survey was developed from input received from doctors, human resources professionals and corporate executives. Scoring measured wellness culture, strategy, communications, programming, and analysis.

"I feel like winning this award is a wonderful recognition of Sandia's commitment to investing in the health and well-being of our employees," says Linda Duffy, director of Health, Benefits and Employees Services Center 3300. "I believe Sandia has been a leader in employee wellness, and winning this award is a tribute to our staff of health professionals."

Sandia's recently launched Virgin HealthMiles, where more than 3,800 enrolled in the first month, was highlighted as part of the award. The program helps Sandians track their health steps, and work to earn up to $250 toward their Health Reimbursement Account.

The NMBW article quotes Linda as saying Sandia's strength is that there is not just one solution. "Different things work for different people," Linda says. "We've been a pioneer in the wellness program area. We began by addressing the most common risks and are very committed to keeping people healthy. It's not just a health care cost containment strategy. It's the right thing to do," Linda says.

Amy Cincotta (3334) leads a lunch-time yoga class at the HBE Employee Health Fitness room in MO 307. (Photo by Randy Montoya)

"We are so lucky to be part of a company with passion not only about its mission and the work of the organization but also about its people and the health of the organization," says Center 3300 Senior Manager Rob Nelson.

Testing the waters

Story by Adrianna Gronager • Photos by Randy Montoya

When Luis Abeyta (1534) began working at Sandia after earning an electrical engineering degree at New Mexico Highlands University, he knew he would be doing various energy studies while working with a team. What never registered on his personal sonar was that he'd be doing it underwater.

LUIS ABEYTA

Luis was assigned to work with researchers at Sandia's Water Impact Facility in Tech Area 3. The facility, with a 300-foot-tall drop tower rising over a 50-foot-deep pool, was built in 1983. It was originally used for tests related to NASA's space program and a US Navy program.

While working on a project with Navy Seal divers at the facility, Luis realized he had a passion for underwater testing — so much so that when he was asked to become the director of the diving team, he dove at the chance. Though he had no prior experience with diving or doing underwater work prior to working at the water impact facility, he was confident he could learn and master what he needed to know.

"I began taking SCUBA diving classes that were provided by local schools, and eventually got my advance diving certification that was needed to lead the team," Luis says.

A variety of tests are conducted at the Water Impact Facility, and Luis has been part of almost every one of them. Research at the facility includes drop testing and studies of pressure vessels, ice penetrations, torpedo impacts, and underwater detonation.

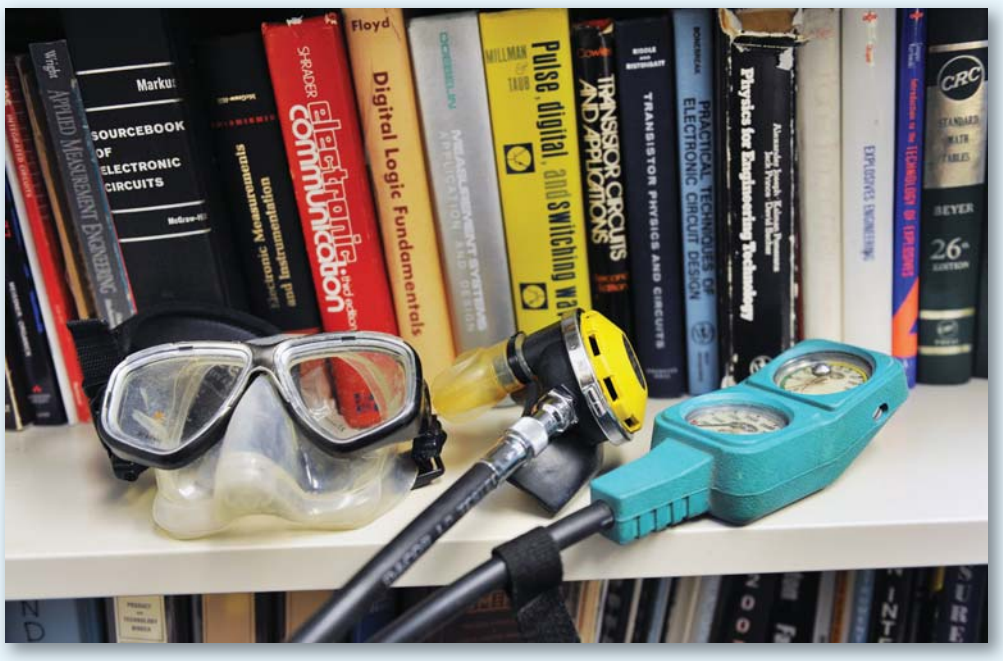
Simple tests can take three to five days to set up, but complex tests can take more than a week. The 300-foot tower that stands above the pool is used to drop objects into the water when conducting a test. For velocities that are needed to be faster than free fall, cables are attached to the test object on one end and to a rocket sled on the other end. Once the rockets are fired, they accelerate the test object down toward the pool. Before impact, the cables are cut and the object plunges into the pool.

"This kind of work is what has kept me here for 31 years. It takes a different type of person to stay and do this kind of work here. Seeing the result is very satisfying," Luis says.

Luis plans to retire in the coming years, but in the meantime, he will be working on a proposal to modify the Water Impact Facility for performing water energy studies due to recent requirement changes.

Luis Abeyta (1534) describes the testing that occurs at the 300-foot water drop tower.

Luis says, "When I retire, the work is what will continue to stand out in my mind. The activities are very unique and when I think about the facility, I know there are other facilities throughout the country, but none of them come close to what we do here."



The complex nature of Luis' career field is represented in the juxtaposition of the contents of his office; SCUBA equipment intermingled with technical manuals.

Mileposts

New Mexico *photos by Michelle Fleming*
California *photos by Randy Wong*


Michael Kopczewski
35 411

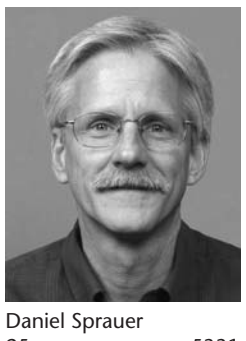

Judy Beiriger
25 5534


Kent de Jong
25 2998


Gary Laughlin
25 5940


Ron Renzi
25 8125


Eric Schindwolf
25 5420


Daniel Sprauer
25 5331


Richard Wavrick
25 2548


Ted Blacker
20 1543


Norma Lauben
20 9546


Nisa Brown
15 416


Jocelyn De Luche
15 4234

LM Voice is coming the week of April 11-29

Got feedback?

Your leaders want to hear your voice!

Sandia's employee survey has a new name and new design, is simpler and will take less time to complete. It's called LM Voice – Powered by Employees – because your feedback matters in shaping changes that make this a better place to work.

The new annual employee survey will be conducted starting the week of April 11-29. Don't miss this quick, confidential opportunity to let leaders know what you think.

LM Voice fully unifies surveys that just a few years ago had been conducted separately on ethics, diversity and employee satisfaction topics. Questions are presented in a consistent manner, and the average completion time should be about 20 minutes for most employees.

LM Voice is a way to share your thoughts about important aspects of your experience at Sandia such as diversity, ethics, career development, leadership, job satisfaction and other related topics.

Your leaders will carefully consider your feedback to understand what's going well and what could be better. Survey results will be shared with all employees, and executives at director level and above will be responsible for implementing action plans to address the feedback received. Make sure to add your voice so that your leader can make the best decisions for your team.

You'll receive an email invitation next week with your personal, confidential password and instructions on how to participate. You can charge your primary project and task to take this survey since the time is considered incidental. Should you have any questions about which project and task to use, contact your manager. Stay tuned for more LM Voice news!

Recent Retirees


John Matter
35 6833

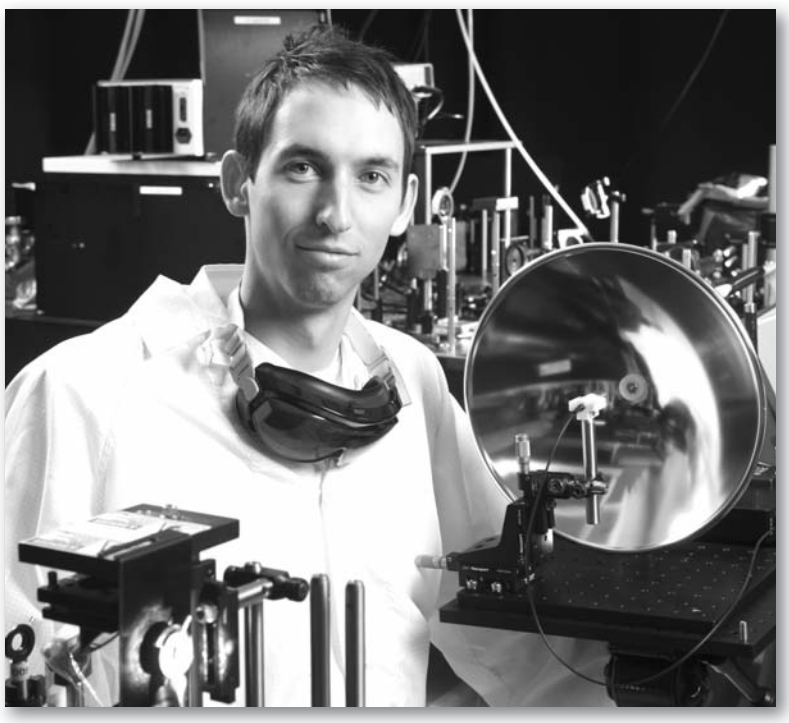

John Wronosky
31 5339


James McCoy
23 2144

Student internship experience at Sandia pays off for Ben Clough

Rensselaer doctoral candidate wins prestigious $30,000 Lemelson Prize

Ben Clough, who did three student internships at Sandia, and who is now a PhD student at Rensselaer Polytechnic Institute, has just been awarded the 2011 Lemelson-MIT-Rensselaer Prize. He credits his work experience and opportunities at Sandia with paving the way for the insights that led to the Lemelson prize.


BEN CLOUGH in his lab at Rensselaer Polytechnic Institute.

The $30,000 prize is for "exceptional inventiveness" in a new technology or better product or process. Each year, the Lemelson Foundation awards a prize to one grad student at each of the following four universities: MIT, Rensselaer, Caltech, and University of Illinois-Urbana-Champaign.

According to a Rensselaer news release, "Benjamin Clough has developed a novel method for eavesdropping on terahertz information encoded into invisible plasma acoustic bursts. [He] has demonstrated a promising technique that employs sound waves to boost the effective distance from which researchers can use powerful terahertz technology to remotely detect hidden explosives, chemicals, and other dangerous materials. . . . Clough's patent-pending approach uses sound waves to remotely 'listen' to terahertz signals from a distance. Focusing two laser beams into air creates small bursts of plasma, which in turn create terahertz pulses. Another pair of lasers can be aimed near the target of interest to create a second plasma for detecting the terahertz pulses after they have interacted with the material. This detection plasma produces acoustic waves as it ionizes the air. Clough discovered that by using a sensitive microphone to "listen" to the plasma, he could detect terahertz wave information embedded in these sound waves. This audio information can then be converted into digital data and instantly checked against a library of known terahertz fingerprints, to determine the chemical composition of the mystery material.

In an email, Clough described his student work at Sandia and how it has applied to his work at Rensselaer: "While working under Richard Cernosek (5719), I spent some time learning analog circuit design and ORCAD PSPICE, a software for simulating analog circuitry, from Larry Anderson (6532). I was helping on an LDRD project to develop the front-end analog amplifier and filters to amplify brainwave signals to voltages readable by analog to digital converters."

"Having an understanding of this analog circuit design has helped me to develop custom filters used to amplify the acoustic signals we are using in our lab [at Rensselaer]. I also used this knowledge to design a circuit for generating high voltage pulses of more than 30,000 volts, sufficient for breaking down air to create a 'simulated' ionization similar to what our laser produces. This helped me gather initial acoustic data using the acoustic equipment without even needing to be in the laser lab that maintains a busy schedule. Also, working under Bruce Tuttle (1816) in the materials department, I first learned some basic LabVIEW programming techniques that we developed to automate testing of futuristic ultrahigh-energy-density capacitors. I use LabVIEW on a regular basis at RPI for collecting data and this helped to expedite collection of the data since I was able to readily modify our LabVIEW software to fit my custom needs. Finally, on a separate occasion at Sandia, I had the opportunity to learn some basics in cad modeling software "SolidWorks." This prior exposure has allowed me to quickly generate three-dimensional mounts for holding optics using our 3-D printer, which can print virtually anything you can make in the CAD software."

Ben is the son of Sandia retiree Roger Clough.

Life-saving device receives first-place prize from the American Society of Mechanical Engineers

By Iris Aboytes

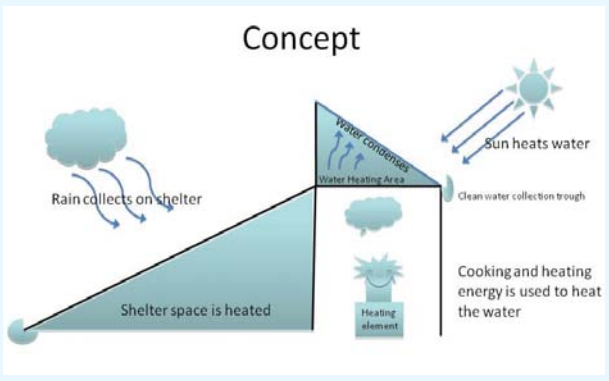
Austin Silva (1462) and Tyler Bushnell (6121) were recently awarded the first place, $6,000 prize from the American Society of Mechanical Engineers of New Mexico for designing a life-saving device. The winners were announced at the Engineers Week luncheon by New Mexico Society of Professional Engineers on Friday, Feb. 25.

The four-week ASME competition's requirement was to design a practical, self-contained, multienergy source that serves as a life-saving device in the event of a natural or manmade disaster in a coastal area.

Austin says it all started with a back-of-napkin basic concept. "From there we bounced ideas around, fed off each other's energy, and the winning design was born."

"I have discovered a new world through design and engineering," Tyler says. "We've created a perfect shelter for use in a disaster. Working on the design ensured it was realistic and used a natural solution – solar energy."

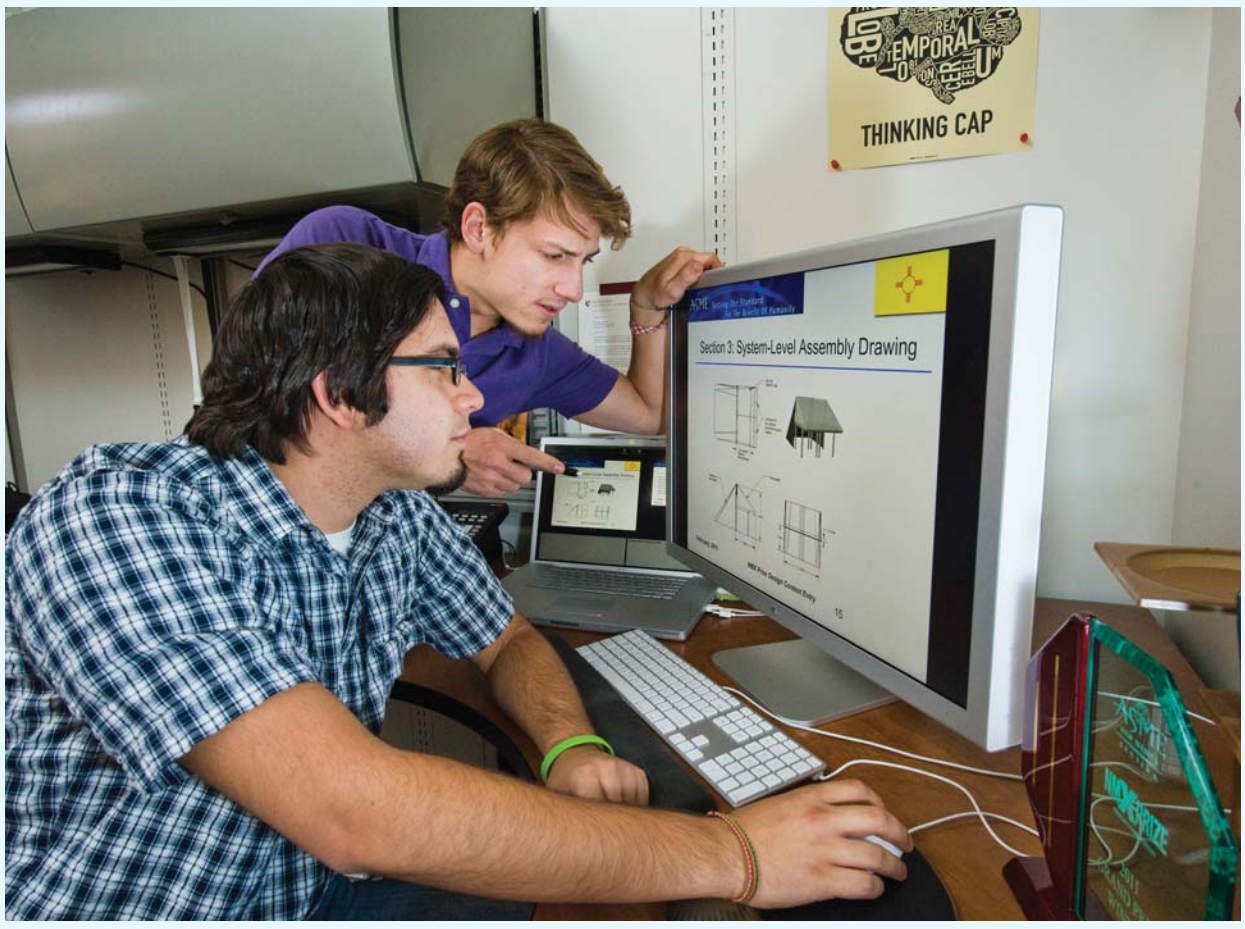
Their concept arrives in a box covered in a thick clear plastic, which is disassembled and reassembled in the form of a raised solar-still desalinator with a tent. The main idea is to use a shelter to conserve heat, and use cooking and heating energy to assist in the desalination process. The solar-still reservoirs are raised and made of steel so that heat, either from cooking or a built fire can be used to accelerate evaporation, and is not lost to the atmosphere.



"Our concept is ready for commercialization," says Tyler.

Austin and Tyler met as freshmen at New Mexico Tech, and have been good friends ever since. Austin is now a Sandian who has recently been accepted into the Masters Fellowship program and Tyler is an intern who will receive his undergraduate degree in mechanical engineering in May.

Austin's undergraduate degree was in electrical engineering but his interests changed. During his time at Sandia, he got involved with projects in cognitive science and how it relates to the human-computer interaction. "Cognitive science is a very important emerging field and the implications that it has on the world are very exciting to me," he says.



Austin Silva (1462), foreground, and Tyler Bushnell (6121) review the intricacies of their award-winning design. The concept is intended to serve as a life-saving solar-still desalinator device in the event of a natural or man-made disaster.

(Photo by Randy Montoya)

Austin is currently working on a project at Sandia that uses electroencephalography (EEG) to study the effects of cognitive training on memory. Through his fellowship he is looking forward to receiving formal training in this field and bringing it back to support Sandia's mission.

This project interested Austin because one of his passions is human-centered design. He would like to use science and engineering to improve the lives of people throughout the world. He was a co-founder of Engineers Without Borders student chapter at New Mexico Tech.

"This design competition was the perfect platform for Tyler and me to display our abilities as globally conscious engineers and designers," Austin says. "We would like this design to become a manufactured reality. The world needs this right now."

Tyler plans to one day pursue his doctorate in design optimization and methodologies. He is interested in exploring the connections between engineering design, psychology, and politics. "The principles of engineering are ultimately about problem solving," he says.

Tyler has been working in wind power at Sandia since the summer of 2010. "It has given me an opportunity to develop my skills as an engineer and to apply my education to real-world problems," he says. "I wanted to include a wind turbine in our concept's design, but it wouldn't fit."

He draws much of his inspiration from travels around the country and abroad, as well as his time working at Walt Disney World. "It's important to hold the details and the big picture in your head at the same time," he mentions, "otherwise you can miss the obvious."

Originally inspired by architecture, he has held graphic and web design jobs. Tyler admits to getting heavily involved in school design projects and seeks out competitions. "I can't get enough of it," he says. "It is the thrill of creation."

Since winning the competition, Austin and Tyler have been invited to multiple presentations showcasing their design. They plan on turning this into New Mexican jobs and a product that the Red Cross or other philanthropic organizations can use to save lives.

This rendering depicts a raised solar-still desalinator. The solar-still reservoirs are made of steel and designed so that heat, either from cooking or a built fire, can be used to accelerate evaporation and is not lost to the atmosphere. (Photo courtesy of Austin Silva)